Using Visible Light Communication in the Smart City Context

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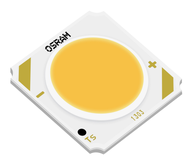
Context and goals

➔ **Evaluate** the performance of **VLC** in different **smart city** applicative **use cases** such as **smart objects**
➔ Propose a series of **smart city services** based on **VLC**
➔ Propose **an efficient** communication **protocol** at **the MAC layer** to take into account the **integration of VLC objects**

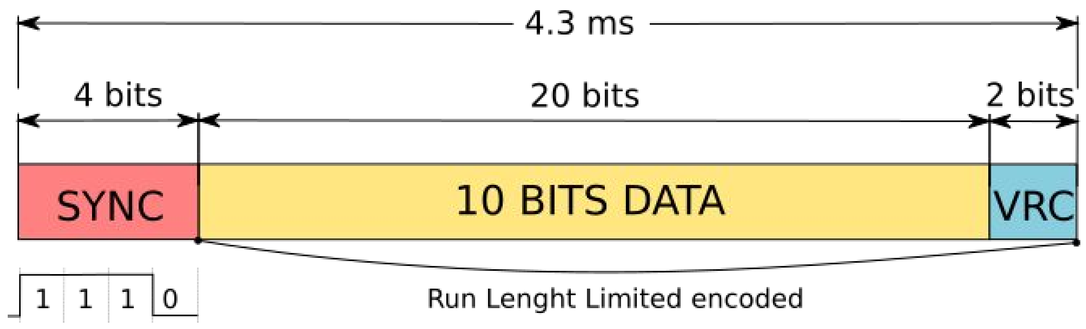


LEDs as Emitter

➔ **IM/DD Modulations**
- On-Off Keying
- Frequency Shift Keying

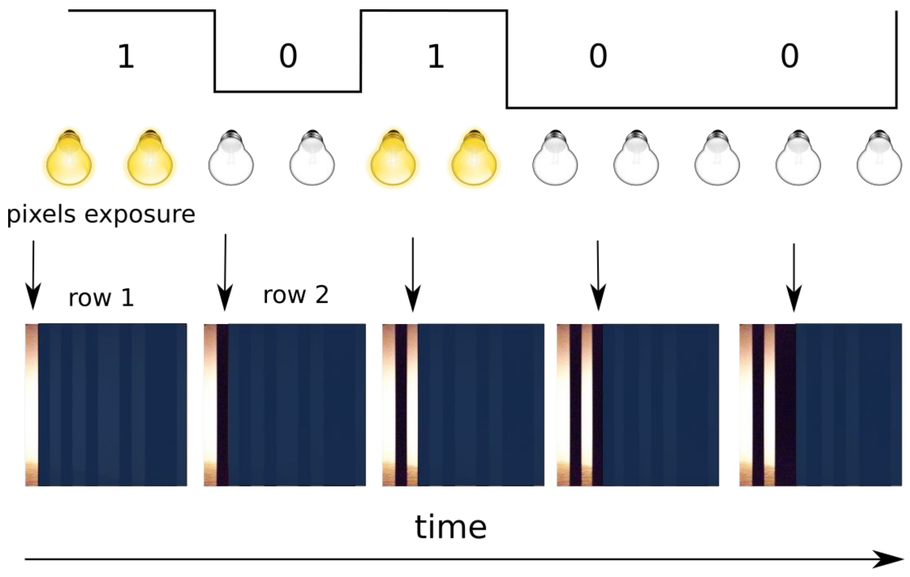
➔ Driven by cheap **MCU**

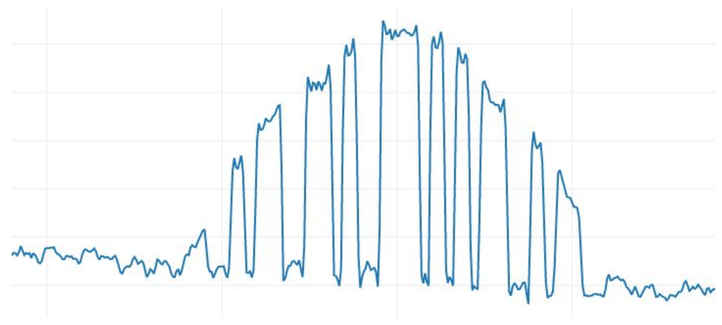
➔ **PHY Layer**
- 6KHz OOK
- Manchester
- 500-4000 bit/s



Smartphone as receiver

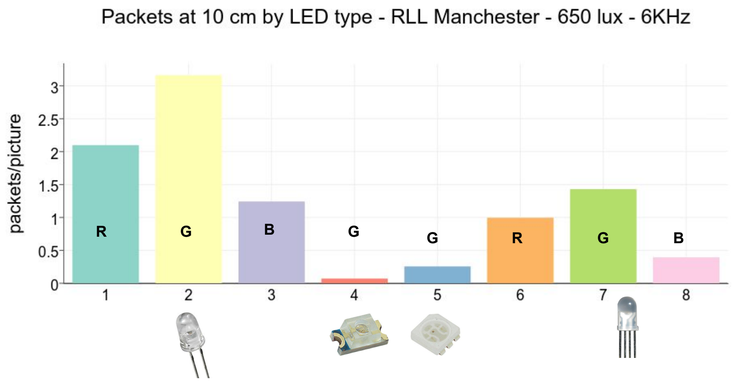
➔ Camera : **CMOS** Sensor
➔ Rolling Shutter Effect



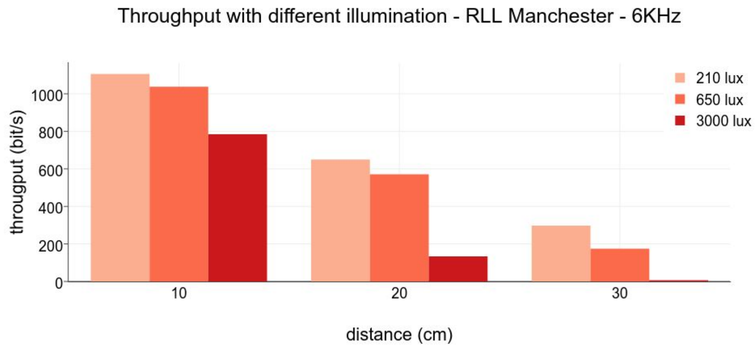


Evaluation

➔ **LED type & color** impact

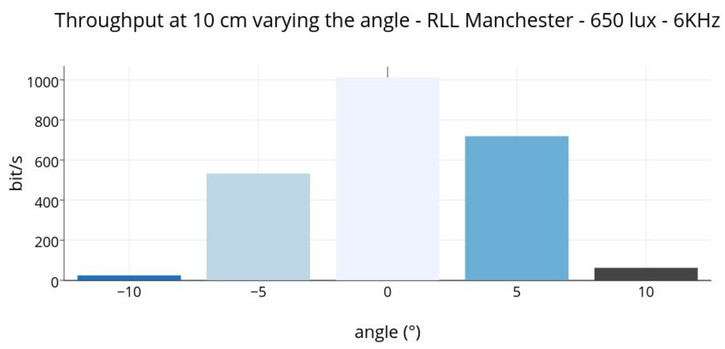


➔ **Illumination** impact

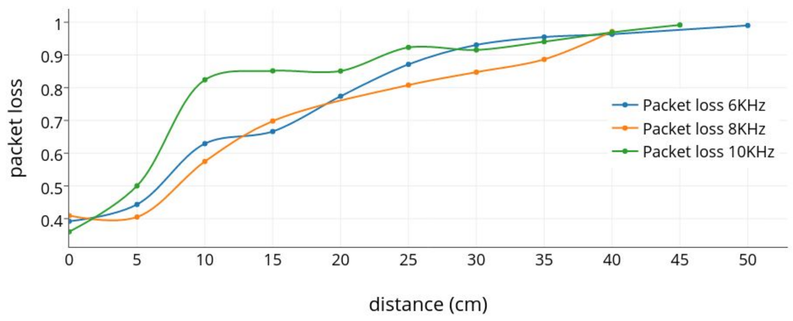


➔ Achieved **throughput**

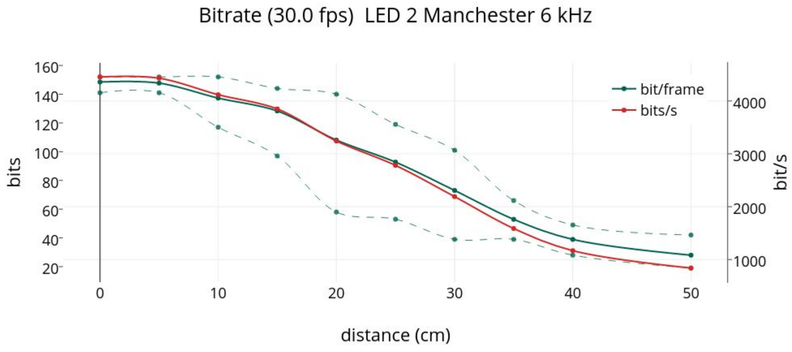
➔ **Angle** impact



➔ Packet **Loss**



➔ **PHY** Bitrate



Use Cases

➔ **Low cost** wireless & smart device

➔ Secured **Near Field Communication**

➔ Accurate **Indoor Localization**

➔ **Contextual Information** broadcasting